Appendix B.8

E-UTRA Band 13

Table of Contents

1. Main Test Instruments

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018/3/13	2021/3/12
Spectrum Analyzer (20Hz-43GHz)	Rohde & Schwarz	FSU43	SEM004-08	2018/4/2	2019/4/1
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017/6/27	2020/6/26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/413	2021/412
Horn Antenna (15-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017/10/17	2020/10/16
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018/9/2	2019/9/2
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2018/9/2	2019/9/2
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	EMC2063	2018/10/20	2019/10/19
Pre-amplifier (26-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018/4/2	2019/4/1
Band filter	N/A	N/A	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018/7/12	2019/7/11
Wideband Radio CommunicationTeste	Anristu	MT8821C	6201462742	2018/5/2	2019/5/1
Wideband Radio CommunicationTester	Rohde & Schwarz	CMW500	W005-02	2018/3/13	2019/3/12

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
Dual Output Mobile Communication DC Source	Agilent Technologies Inc	66311B	W009-09	2018/9/15	2019/9/15
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2018/3/13	2019/3/12
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/12	2019/7/11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/9/2	2019/9/2
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	HTC-1	W006-17	2018/9/10	2019/9/10
Temperature Chamber	GIANT FORCE	ICT-150-40-CP-AR	W027-03	2018/11/27	2019/11/27
Wideband Radio CommunicationTeste	Anristu	MT8821C	6201462742	2018/5/2	2019/5/1
Wideband Radio CommunicationTester	Rohde & Schwarz	CMW500	W005-02	2018/3/13	2019/3/12

2. Measurement Uncertainty

For a 95% confidence level (k = 2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Test Item	Extended Uncertainty	Data
Transmit Output Power Data	Power [dBm]	U =±0.37 dB
Bandwidth	Magnitude [%]	U =± 0.2%
Band Edge Compliance	Disturbance Power [dBm]	U = ±2.0 dB
Spurious Emissions, Conducted	Disturbance Power [dBm]	U = ±2.0 dB
Frequency Stability	Frequency Accuracy [ppm]	U = ±0.24 ppm

3. Effective (Isotropic) Radiated Power

3.1. Test Result

BAND	Bandwidth	Modulation	Channel	RB Configuration	Result (dBm)	ERP (dBm)	Result (dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	23.43	19.66	34.77	PASS
Band13	5MHz	QPSK	23205	1RB#12	23.12	19.35	34.77	PASS
Band13	5MHz	QPSK	23205	1RB#24	23.21	19.44	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#0	22.60	18.83	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#6	22.45	18.68	34.77	PASS
Band13	5MHz	QPSK	23205	12RB#13	22.35	18.58	34.77	PASS
Band13	5MHz	QPSK	23205	25RB#0	22.51	18.74	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#0	23.35	19.58	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#12	23.54	19.77	34.77	PASS
Band13	5MHz	QPSK	23230	1RB#24	23.36	19.59	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#0	22.46	18.69	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#6	22.40	18.63	34.77	PASS
Band13	5MHz	QPSK	23230	12RB#13	22.44	18.67	34.77	PASS
Band13	5MHz	QPSK	23230	25RB#0	22.42	18.65	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#0	23.29	19.52	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#12	23.56	19.79	34.77	PASS
Band13	5MHz	QPSK	23255	1RB#24	23.29	19.52	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#0	22.40	18.63	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#6	22.47	18.70	34.77	PASS
Band13	5MHz	QPSK	23255	12RB#13	22.35	18.58	34.77	PASS
Band13	5MHz	QPSK	23255	25RB#0	22.40	18.63	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#0	22.05	18.28	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#12	22.66	18.89	34.77	PASS
Band13	5MHz	16QAM	23205	1RB#24	21.88	18.11	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#0	21.33	17.56	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#6	21.32	17.55	34.77	PASS
Band13	5MHz	16QAM	23205	12RB#13	21.44	17.67	34.77	PASS
Band13	5MHz	16QAM	23205	25RB#0	21.58	17.81	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#0	21.98	18.21	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#12	22.66	18.89	34.77	PASS
Band13	5MHz	16QAM	23230	1RB#24	21.89	18.12	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#0	21.40	17.63	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#6	21.51	17.74	34.77	PASS
Band13	5MHz	16QAM	23230	12RB#13	21.45	17.68	34.77	PASS
Band13	5MHz	16QAM	23230	25RB#0	21.51	17.74	34.77	PASS
Band13	5MHz	16QAM	23255	1RB#0	22.28	18.51	34.77	PASS
Band13	5MHz	16QAM	23255	1RB#12	22.53	18.76	34.77	PASS

Band13	5MHz	16QAM	23255	1RB#24	22.34	18.57	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#0	21.26	17.49	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#6	21.32	17.55	34.77	PASS
Band13	5MHz	16QAM	23255	12RB#13	21.27	17.50	34.77	PASS
Band13	5MHz	16QAM	23255	25RB#0	21.46	17.69	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#0	23.24	19.47	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#24	23.57	19.80	34.77	PASS
Band13	10MHz	QPSK	23230	1RB#49	23.02	19.25	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#0	22.44	18.67	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#12	22.47	18.70	34.77	PASS
Band13	10MHz	QPSK	23230	25RB#25	22.24	18.47	34.77	PASS
Band13	10MHz	QPSK	23230	50RB#0	22.44	18.67	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#0	22.02	18.25	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#24	22.29	18.52	34.77	PASS
Band13	10MHz	16QAM	23230	1RB#49	21.84	18.07	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#0	21.55	17.78	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#12	21.46	17.69	34.77	PASS
Band13	10MHz	16QAM	23230	25RB#25	21.30	17.53	34.77	PASS
Band13	10MHz	16QAM	23230	50RB#0	21.44	17.67	34.77	PASS

Remark:

a: For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

ERP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBd]

EIRP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBi]

b: SGP=Signal Generator Level

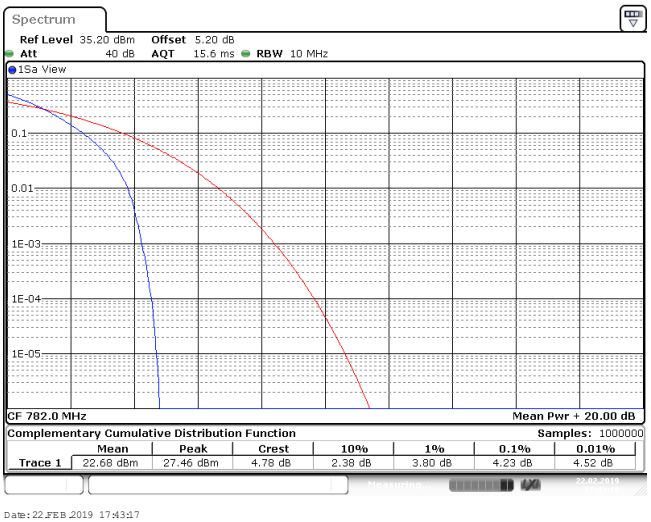
4. Peak-to-Average Ratio(CCDF)

4.1. Test Result

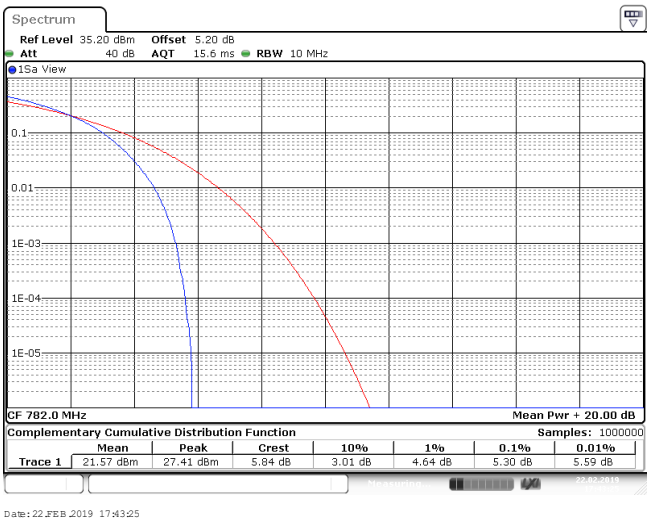
BAND	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	4.23	13	PASS
Band13	10MHz	16QAM	23230	50RB#0	5.30	13	PASS

4.2. Test Plots

Band13_10MHz_QPSK_23230_50RB#0



Band13_10MHz_16QAM_23230_50RB#0

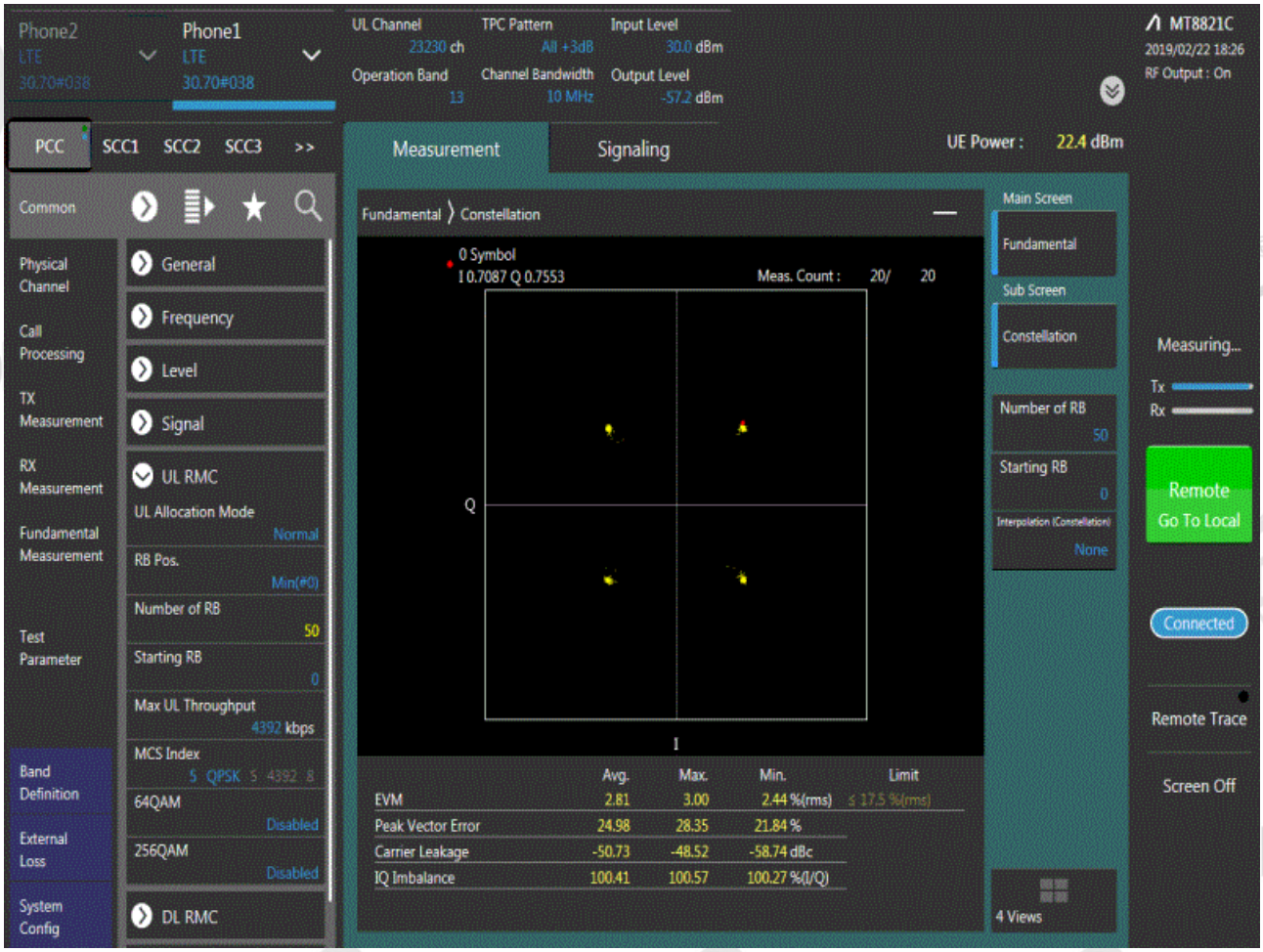


5. Modulation Characteristics

5.1. Test BAND = LTE Band 13

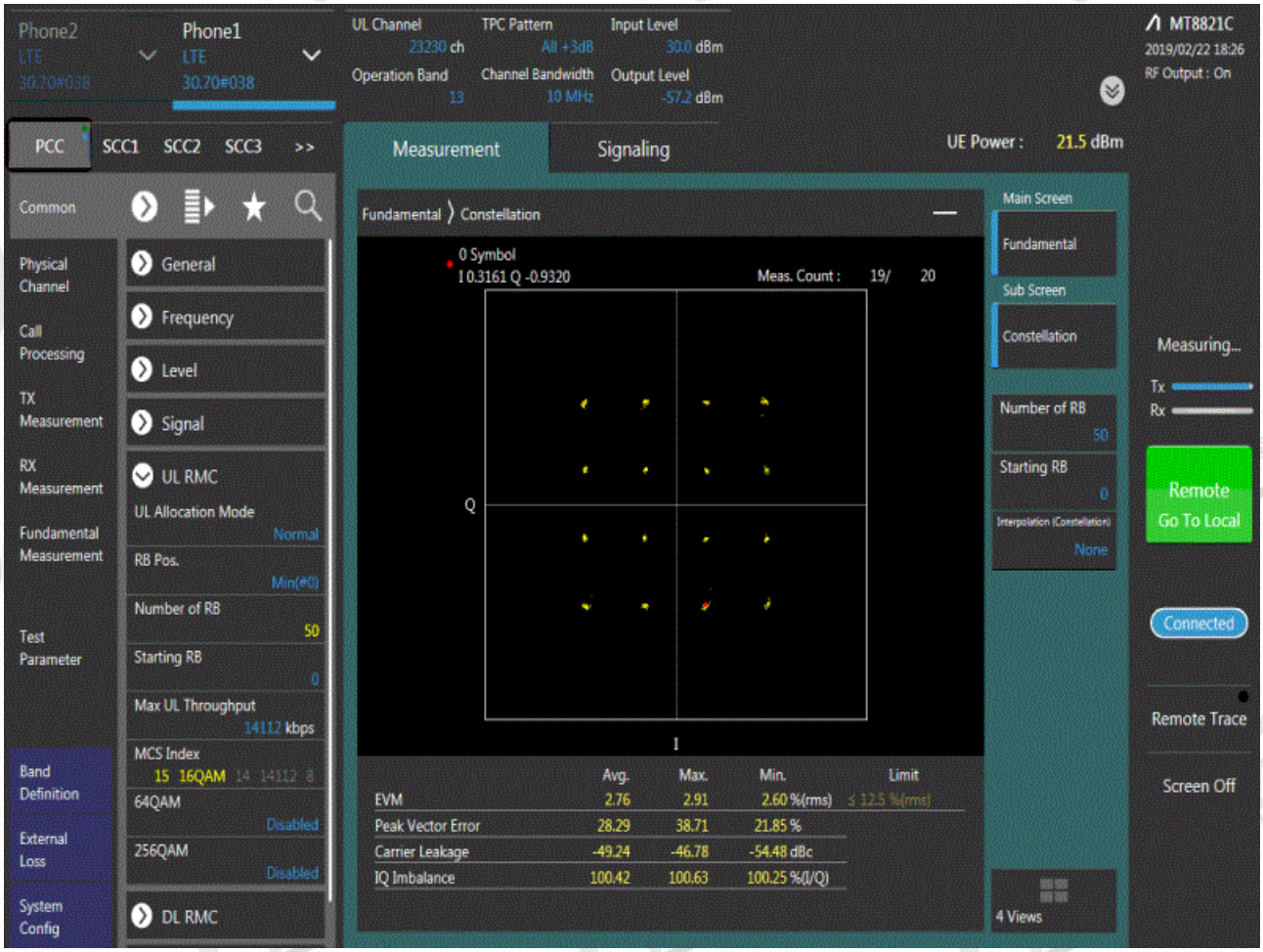
5.2. Test Mode = LTE /TM1 10MHz

5.2.1.Test Channel = MCH



5.3. Test Mode = LTE /TM2 10MHz

5.3.1.Test Channel = MCH



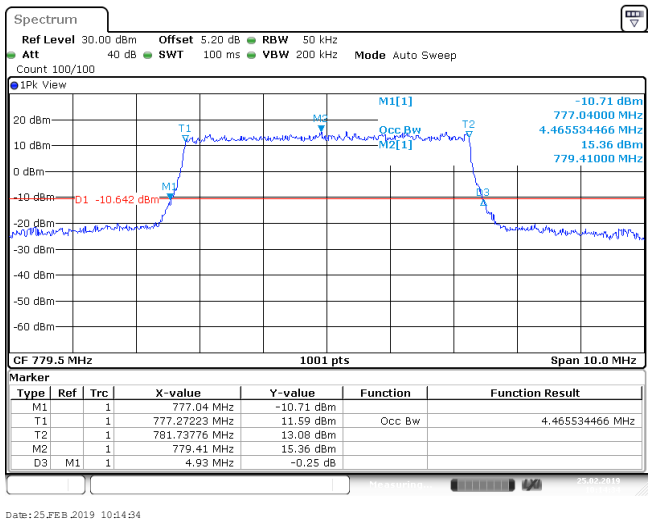
6. 26dB Bandwidth and Occupied Bandwidth

6.1. Test Result

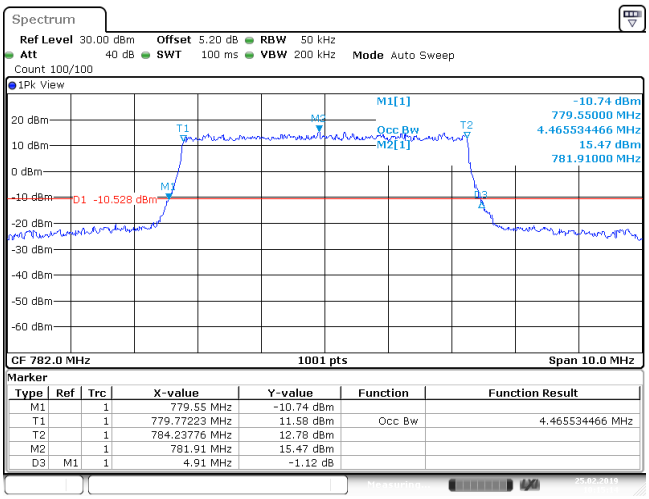
BAND	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	4.466	4.930	PASS
Band13	5MHz	QPSK	23230	25RB#0	4.466	4.910	PASS
Band13	5MHz	QPSK	23255	25RB#0	4.476	4.910	PASS
Band13	5MHz	16QAM	23205	25RB#0	4.486	4.980	PASS
Band13	5MHz	16QAM	23230	25RB#0	4.486	4.960	PASS
Band13	5MHz	16QAM	23255	25RB#0	4.496	4.970	PASS
Band13	10MHz	QPSK	23230	50RB#0	8.891	9.680	PASS
Band13	10MHz	16QAM	23230	50RB#0	8.911	9.740	PASS

6.2. Test Plots

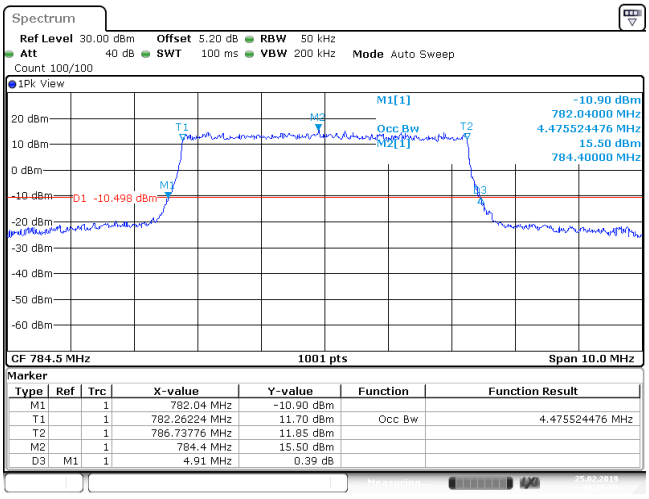
Band13_5MHz_QPSK_23205_25RB#0



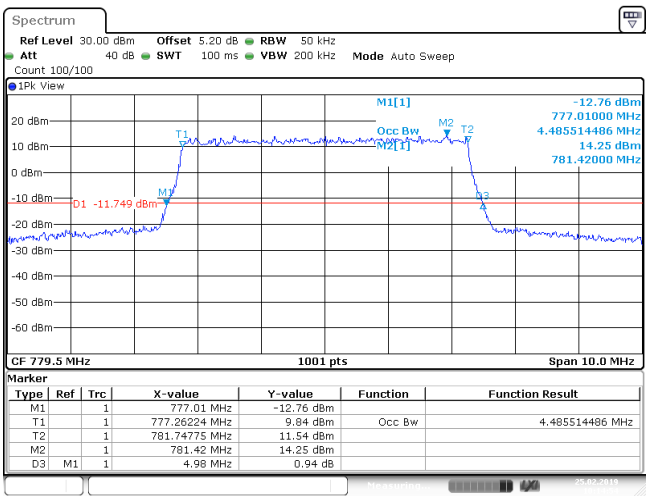
Band13_5MHz_QPSK_23230_25RB#0



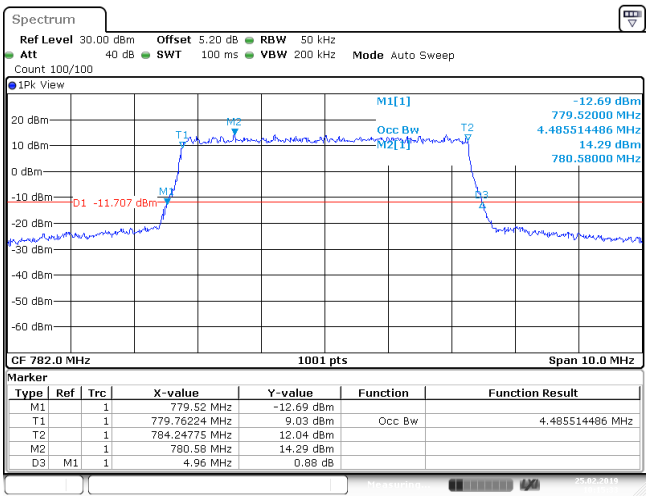
Band13_5MHz_QPSK_23255_25RB#0



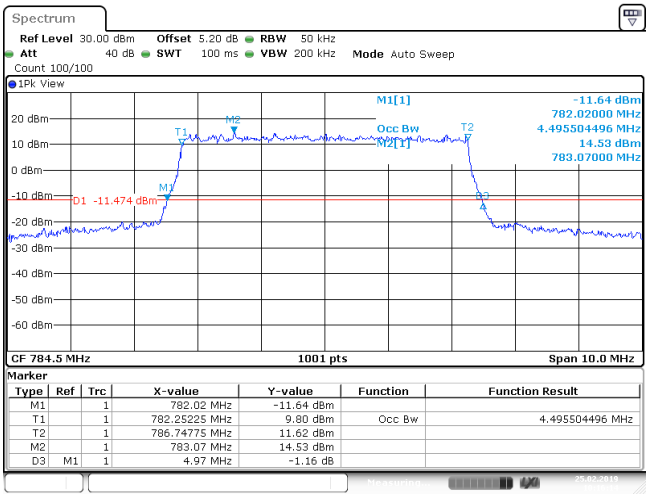
Band13_5MHz_16QAM_23205_25RB#0



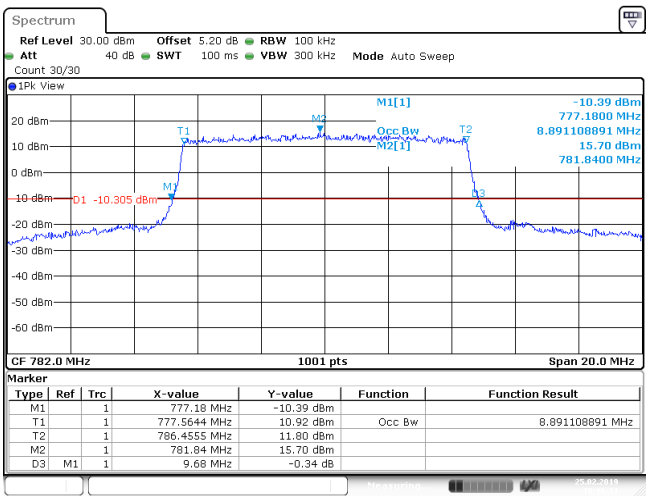
Band13_5MHz_16QAM_23230_25RB#0



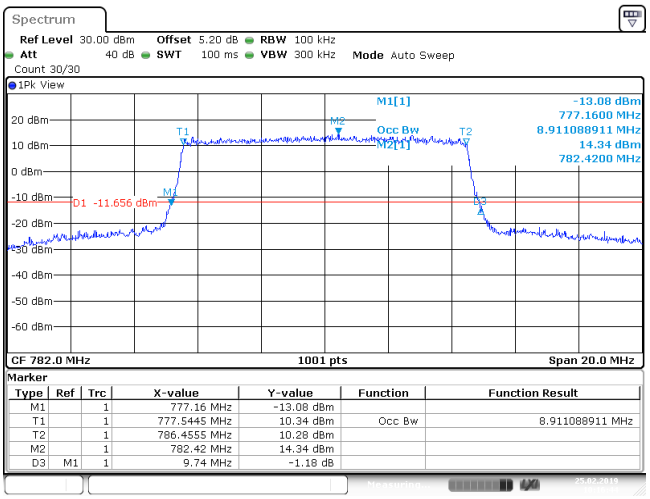
Band13_5MHz_16QAM_23255_25RB#0



Band13_10MHz_QPSK_23230_50RB#0



Band13_10MHz_16QAM_23230_50RB#0



7. Band Edge Compliance

7.1. Test Plots

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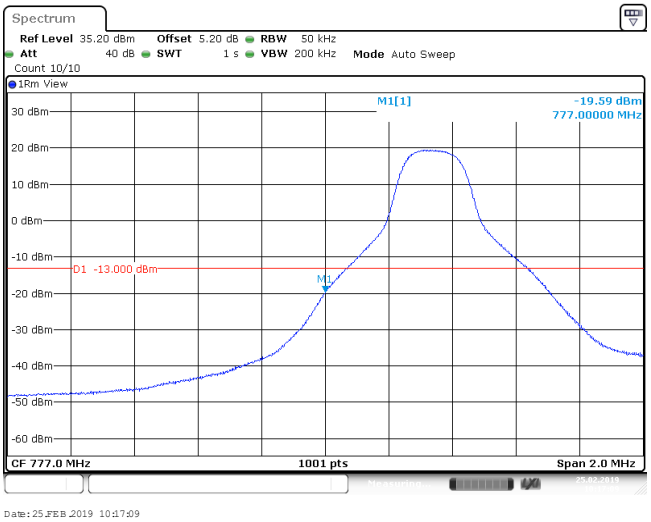
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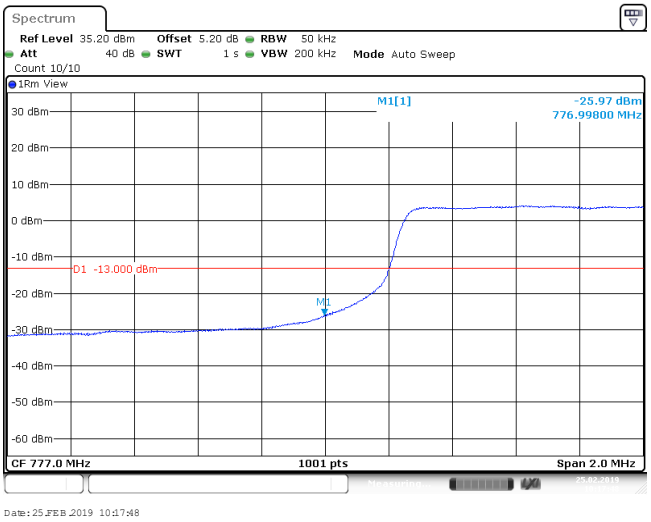
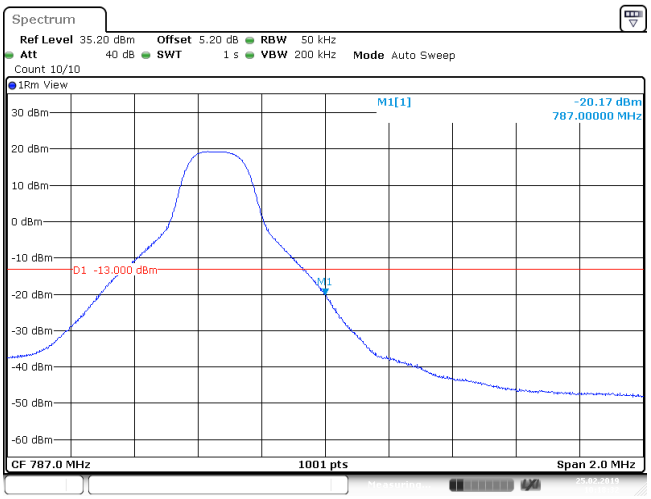
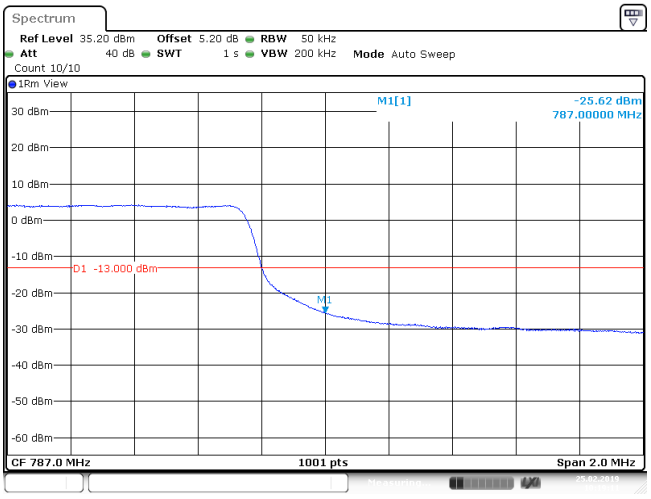


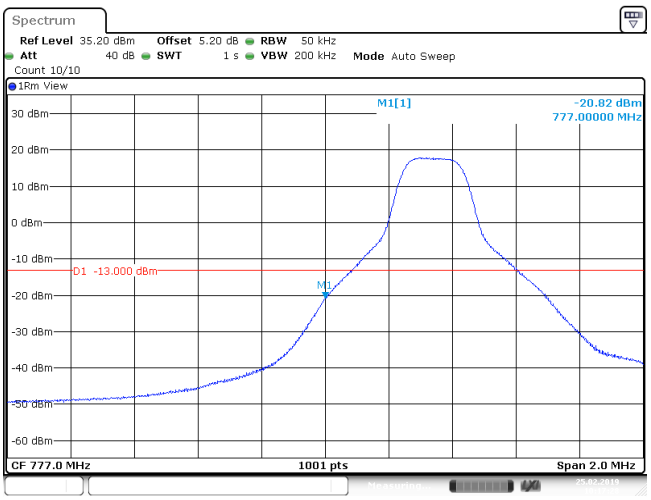
Band13_5MHz_QPSK_23255_1RB#24



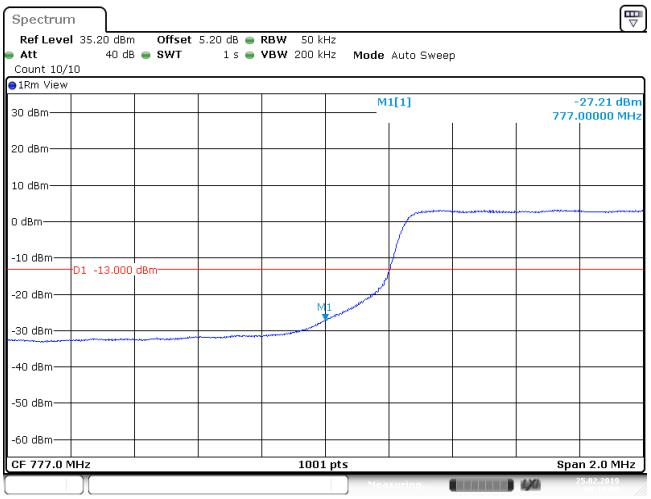
Band13_5MHz_QPSK_23255_25RB#0



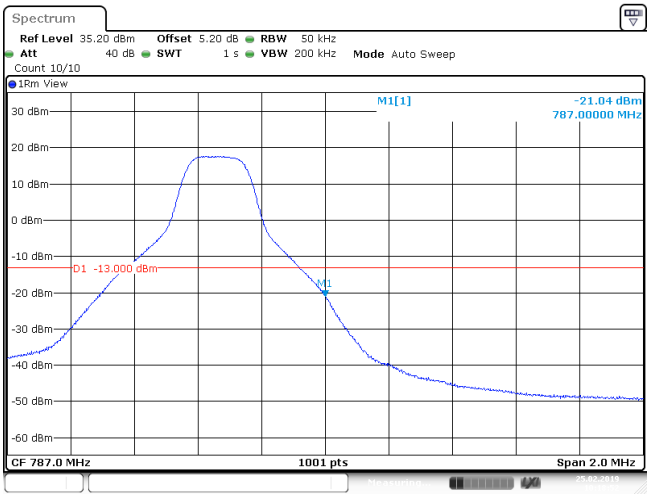
Band13_5MHz_16QAM_23205_1RB#0



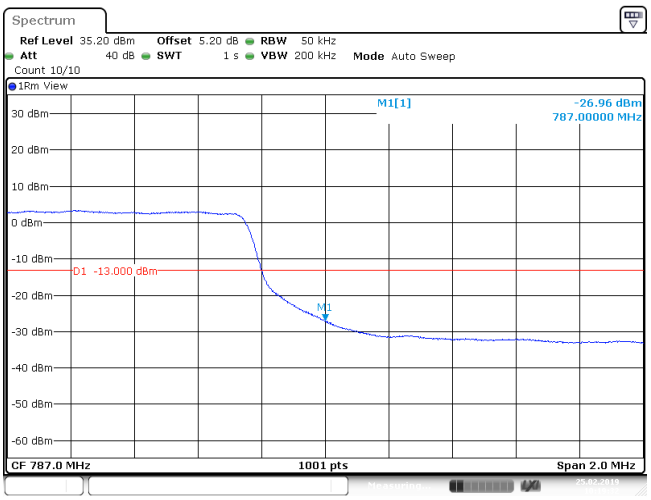
Band13_5MHz_16QAM_23205_25RB#0



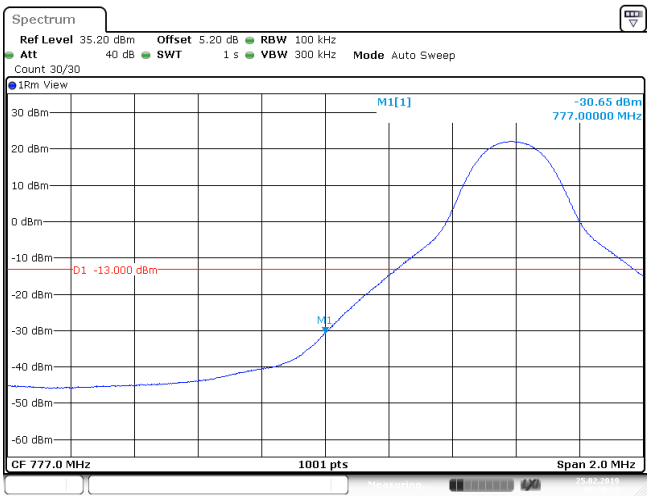
Band13_5MHz_16QAM_23255_1RB#24



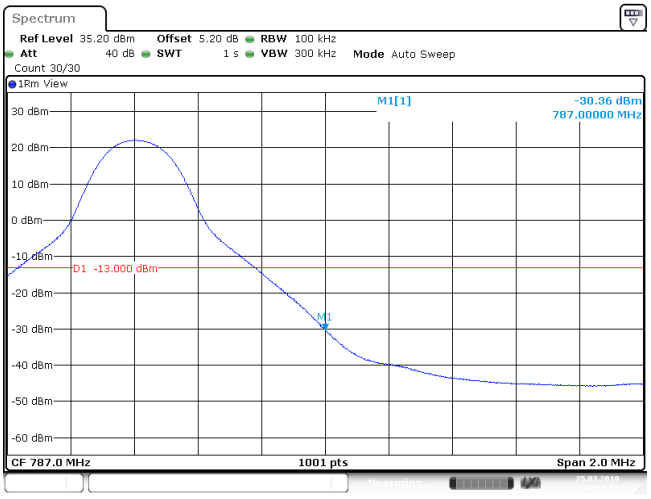
Band13_5MHz_16QAM_23255_25RB#0



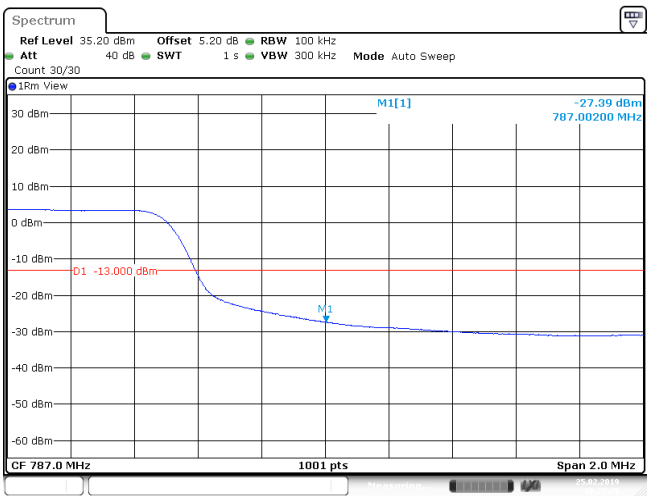
Band13_10MHz_QPSK_23230_Left_1RB#0



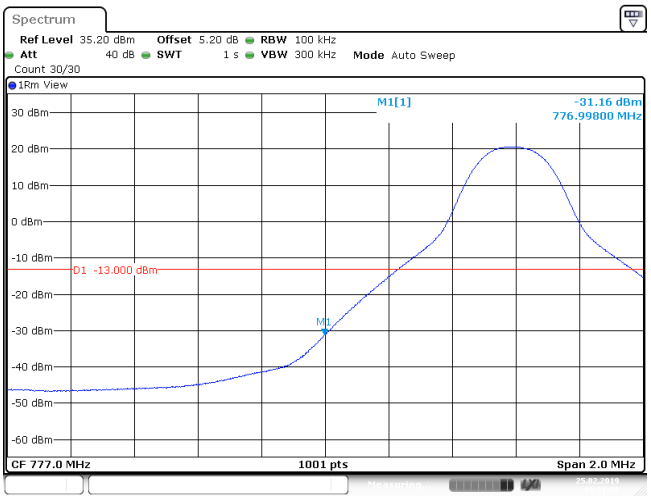
Band13_10MHz_QPSK_23230_Right_1RB#49



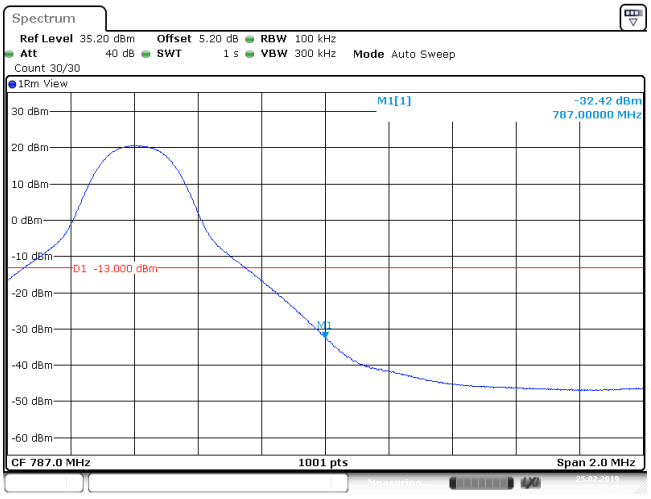
Band13_10MHz_QPSK_23230_Right_50RB#0



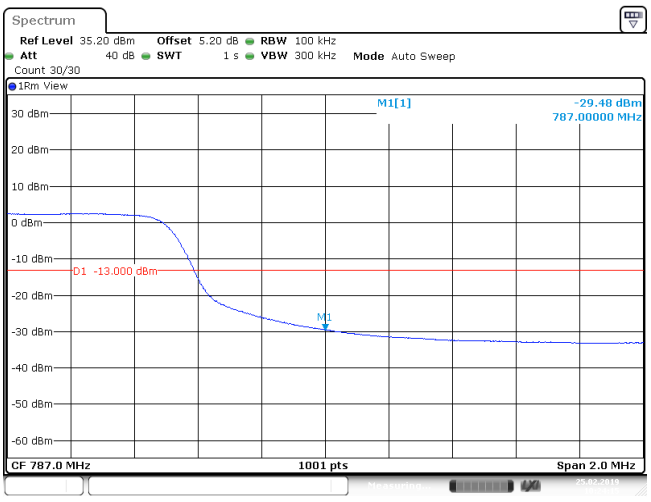
Band13_10MHz_16QAM_23230_Left_1RB#0



Band13_10MHz_16QAM_23230_Right_1RB#49



Band13_10MHz_16QAM_23230_Right_50RB#0

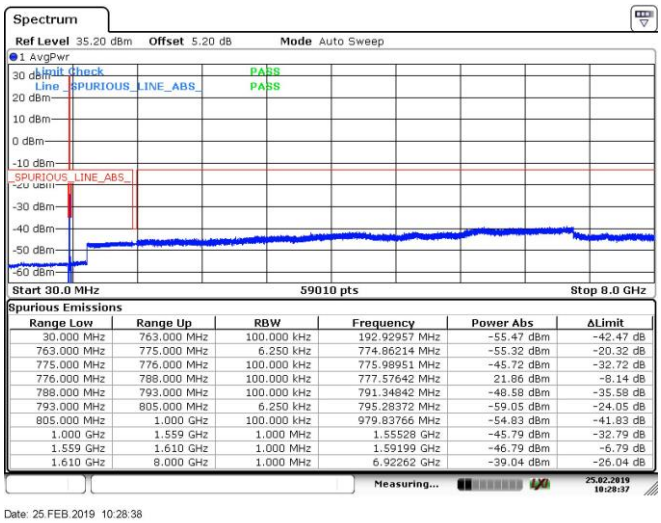


8. Spurious Emission at Antenna Terminal

Remark1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of < RBW/2 so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = k * (Span / RBW)" with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.
Remark2: only the worst case data displayed in this report.

8.1. Test Plots

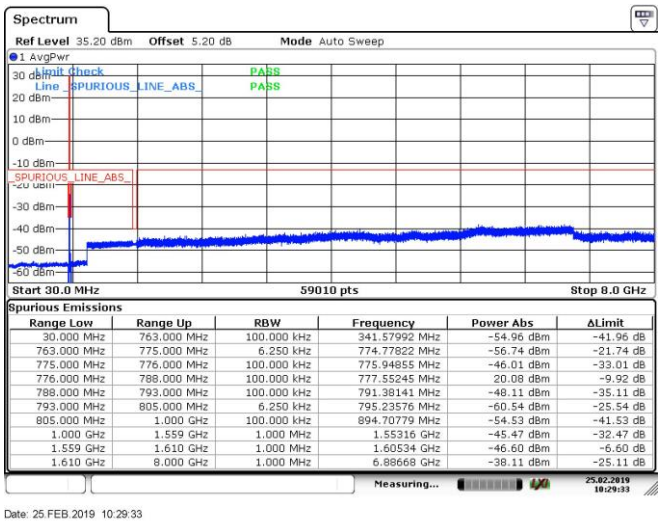
Band13_10MHz_QPSK_23230_1RB#0



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	192.92957 MHz	-55.47 dBm	-42.47 dB
763.000 MHz	775.000 MHz	6.250 kHz	774.86214 MHz	-55.32 dBm	-20.32 dB
775.000 MHz	776.000 MHz	100.000 kHz	775.98951 MHz	-45.72 dBm	-32.72 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.57642 MHz	21.86 dBm	-8.14 dB
788.000 MHz	793.000 MHz	100.000 kHz	791.34842 MHz	-48.58 dBm	-35.58 dB
793.000 MHz	805.000 MHz	6.250 kHz	795.28372 MHz	-59.05 dBm	-24.05 dB
805.000 MHz	1.000 GHz	100.000 kHz	979.83766 MHz	-54.83 dBm	-41.83 dB
1.000 GHz	1.559 GHz	1.000 MHz	1.55528 GHz	-45.79 dBm	-32.79 dB
1.559 GHz	1.610 GHz	1.000 MHz	1.59199 GHz	-46.79 dBm	-6.79 dB
1.610 GHz	8.000 GHz	1.000 MHz	6.92262 GHz	-39.04 dBm	-26.04 dB

Band13_10MHz_16QAM_23230_1RB#0



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	763.000 MHz	100.000 kHz	341.57992 MHz	-54.96 dBm	-41.96 dB
763.000 MHz	775.000 MHz	6.250 kHz	774.77822 MHz	-56.74 dBm	-21.74 dB
775.000 MHz	776.000 MHz	100.000 kHz	775.94855 MHz	-46.01 dBm	-33.01 dB
776.000 MHz	788.000 MHz	100.000 kHz	777.55245 MHz	20.08 dBm	-9.92 dB
788.000 MHz	793.000 MHz	100.000 kHz	791.38141 MHz	-48.11 dBm	-35.11 dB
793.000 MHz	805.000 MHz	6.250 kHz	795.23576 MHz	-60.54 dBm	-25.54 dB
805.000 MHz	1.000 GHz	100.000 kHz	894.70779 MHz	-54.53 dBm	-41.53 dB
1.000 GHz	1.559 GHz	1.000 MHz	1.55316 GHz	-45.47 dBm	-32.47 dB
1.559 GHz	1.610 GHz	1.000 MHz	1.60534 GHz	-46.60 dBm	-6.60 dB
1.610 GHz	8.000 GHz	1.000 MHz	6.88668 GHz	-38.11 dBm	-25.11 dB

9. Frequency Stability

9.1. Frequency Vs Voltage

Voltage										
BAND	Bandwidth	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	VL	NT	-0.40	-0.000512	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VN	NT	1.00	0.001279	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VH	NT	0.00	0.000000	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VL	NT	0.00	0.000000	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VN	NT	1.10	0.001407	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VH	NT	-0.30	-0.000384	±2.5	PASS

9.2. Frequency Vs Temperature

Temperature										
BAND	Bandwidth	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	10MHz	QPSK	23230	50RB#0	NV	-30	-0.90	-0.001151	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-20	-0.40	-0.000512	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	0	0.30	0.000384	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	10	0.10	0.000128	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	20	0.20	0.000256	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	30	0.80	0.001023	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	40	0.30	0.000384	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	50	-0.20	-0.000256	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-30	0.00	0.000000	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-20	-1.00	-0.001279	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	0	0.60	0.000767	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	10	-0.40	-0.000512	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	20	-0.40	-0.000512	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	30	-0.60	-0.000767	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	40	-0.90	-0.001151	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	50	0.50	0.000639	±2.5	PASS

The End